Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 8/2/2021 11:55:22 AM
To: Peter Tsirigotis (Tsirigotis.Peter@epa.gov) [Tsirigotis.Peter@epa.gov]; Kevin Culligan (Culligan.Kevin@epa.gov) [Culligan.Kevin@epa.gov]
CC: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: FW: NTAA Comment Letter on EPA's Upcoming Oil and Natural Gas Methane Rule, Docket ID No. EPA-HQ- OAR-2021-0295
Attachments: ATT00001.txt; 2021-07-30- NTAA Comment Letter on EPA methane oil and natural gas rulemaking.pdf

FYA

From: Andy Bessler <Andy.Bessler@nau.edu>
Sent: Friday, July 30, 2021 3:28 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Childers, Pat <Childers.Pat@epa.gov>; Ndoh, Tina <Ndoh.Tina@epa.gov>; Allison Gienapp <agienapp@poncatribe-ne.org>; Angela Benedict <angela.benedict@srmt-nsn.gov>; billietoledo@pbpnation.org; Brandy Toft <brandy.toft@llojibwe.net>; ckriebs@kootenai.org; CKreman@quapawtribe.com; joywiecks@fdlrez.com; Lozada, Tiffany <tlozada@pci-nsn.gov>; lucas.bair@spokanetribe.com; lweeks@nemont.net; marvin@wabanaki.com; randall.ashley@cskt.org; Scott Hansen <Scott.hansen@catawbaindian.net>; Steven Smith <SteveSmith@shinnecock.org>; maxine.paul@santaana-nsn.gov; Ryan Tsingine <Ryan.Tsingine@nau.edu>; Mariah Tanay Ashley <Mariah.Ashley@nau.edu>; Dara Renee Marks-Marino <dara.marks-marino@nau.edu>
Subject: NTAA Comment Letter on EPA's Upcoming Oil and Natural Gas Methane Rule, Docket ID No. EPA-HQ- OAR-2021-0295

Hello Again Acting Assistant Administrator Goffman:

Please find the attached letter to you from NTAA Chairwoman Carol Kriebs. I have also submitted this letter via regulations.gov. NTAA's comment letter has been assigned the Comment Tracking Number: krq-qb7w-0tye.

Thank you in advance for your consideration of NTAA's comments as the rulemaking process to regulate methane advances.

On another note, I wanted to let you know that we are working to finalize an agenda for a virtual meeting of the NTAA Executive Committee (NTAA EC) during the final week of August, 2021.

We will be sending you an invitation to join the NTAA EC during that meeting and hope we can work with your office to find a time to meet that accommodates your schedule.

Again, thank you for your engagement with NTAA to advance air quality on and around Tribal lands.

Andy

Andy Bessler
Pronouns: (He/Him)
Project Director

National Tribal Air Association
Institute for Tribal Environmental Professionals
Northern Arizona University
P.O. Box 15004
Flagstaff, AZ 86011
Office 928-523-0526
Cell 928-380-7808
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www.ntaatribalair.org

"Northern Arizona University sits at the base of the San Francisco Peaks, on homelands sacred to Native Americans throughout the region. We honor their past, present, and future generations, who have lived here for millennia and will forever call this place home."

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July 30, 2021

Joseph Goffman, Acting Assistant Administrator
U.S. EPA Office of Radiation and Indoor Air
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Upcoming Oil and Natural Gas Methane Rule, Docket ID No. EPA-HQ-OAR-2021-0295

Dear Mr. Goffman:

The National Tribal Air Association (NTAA) is pleased to submit these pre-proposal comments regarding the U.S. Environmental Protection Agency's (EPA's) Upcoming Oil and Natural Gas Methane Rule.

The NTAA is a member-based organization with 153 principal member Tribes. The organization's mission is to advance air quality management policies and programs, consistent with the needs, interests, and unique legal status of Indian Tribes. As such, the NTAA uses its resources to support the efforts of all federally recognized Tribes in protecting and improving the air quality within their respective jurisdictions. Although the organization always seeks to represent consensus perspectives on any given issue, it is important to note that the views expressed by the NTAA may not be agreed upon by all Tribes. Further, it is also important to understand interactions with the organization do not substitute for government-to-government consultation, which can only be achieved through direct communications between the federal government and Indian Tribes.

The NTAA agrees with the EPA's recognition that national standards and guidelines are needed to reduce methane and other harmful pollutants from new and existing sources in the oil and natural gas industry. The NTAA appreciates the EPA's pre-proposal public outreach efforts and expressed desire to collect input from a broad range of stakeholders. The NTAA requests that these efforts not only continue, but that they be expanded, particularly with respect to coordination and consultation with Indian Tribes. Significant oil and natural gas sources are on and near Tribal lands, and methane, volatile organic compound (VOC), and hazardous air pollutant (HAP) emissions from the oil and natural gas industry negatively impact Tribal communities. Those impacts are not homogeneous across all Tribal lands and each Tribe's unique circumstances must be evaluated. Additionally, oil and natural gas development can provide important revenue for Tribes, making strong, cost-effective national requirements and standards all the more important. Public listening sessions and training webinars are helpful but not sufficient; the EPA must consult directly with Tribes on a government-to-government basis and must evaluate the industries and proposed rule's unique impacts to Indian Tribes.

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Following robust coordination and consultation with Indian Tribes, the NTAA urges the EPA to adopt strong and protective standards and guidelines for new, modified, and existing oil and natural gas sources. There are cost-effective controls available today that significantly reduce methane, VOC, and HAP emissions from oil and natural gas equipment used in new and existing oil and natural gas production, transmission, and storage sources. These reductions are necessary to protect human health and the environment and prevent the most catastrophic consequences of climate change. In particular, the NTAA urges the EPA to require sources to implement controls that reduce or eliminate fugitive emissions, intentionally vented emissions, and combustion emissions to the maximum extent possible. The NTAA urges the EPA to further work with Tribes, providing necessary resources and support, to assure these protections are implemented on Tribal lands in accordance with each Tribe's unique needs. Time is of the essence for controlling these emissions and the NTAA also urges the EPA propose, finalize, and implement regulations and guidelines based on a well-developed and scientifically sound record as soon as possible.

Background

Methane is a potent greenhouse gas with at least 25 times the global warming potential of carbon dioxide.[1] The Fourth National Climate Assessment documents that: "Climate change increasingly threatens Indigenous communities' livelihoods, economies, health, and cultural identities by disrupting interconnected social, physical, and ecological systems."[2] In general, Tribal communities have disproportionately high rates of asthma, cardiovascular disease, Alzheimer's or dementia, diabetes, and obesity.[3] These health disparities have direct linkages to increased vulnerability to climate change.

The emissions from oil and natural gas sources not only contribute to climate impacts, but seriously burdens the health of nearby Tribal communities. Ozone-forming VOCs and HAPs like benzene are emitted alongside methane. Inhalation of these dangerous pollutants can lead to irreversible lung damage, asthma attacks, and cancer, which Tribal communities already suffer at disproportionate rates.

[1] Overview of Greenhouse Gases: Methane Emissions, U.S. EPA, https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane. In 2013, the Intergovernmental Panel on Climate Change released its Fifth Assessment Report ("AR5"), revising upward its earlier 100-year global warming potential for fossil methane from 25 to 36. IPCC, Fifth Assessment Report, Climate Change 2013 The Physical Science Basis, Chapter 8: Anthropogenic and Natural Radiative Forcing (Sept. 2013), at 714, Table 8.7, available at https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf.

[2] USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018; *see also* National Tribal Air Association, Status of Tribal Air Report 2021, at 16, 51 https://secureservercdn.net/198.71.233.47/7vv.611.myftpupload.com/wp-content/uploads/2021/05/2021-NTAA-Status-of-Tribal-Air-Report.pdf.

[3] *Id.*

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Environmental Justice

Executive Order 12,898 mandates that: "[E]ach federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its program, policies, and activities on minority populations and low-income populations." President Biden recently expanded on the federal government's commitment to environmental justice (EJ) in Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, explaining the goal to prioritize environmental justice and that "the Federal Government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality." Exec. Order No. 13,990 of Jan. 20, 2021, 86 Fed. Reg. 7037 (Jan. 25, 2021).[4] Responding to that order, Administrator Regan directed all EPA offices to clearly integrate environmental justice considerations into their plans and actions.[5] In this rulemaking, the EPA must look at the environmental justice implications of their proposed action and seek to advance equity for all.

Tribal Implications

While EJ concerns may apply to many American Indian/Alaska Native (AI/AN) communities, there also needs to be recognition that Tribes are very distinct entities that preexist establishment of the United States. They possess authority that predates the U.S. Constitution regarding the governance of their own internal affairs. For these reasons, EJ is an important issue, but must never usurp Tribal sovereignty and self-determination. Further, EJ must never replace government-to-government consultation directly with Tribes. Any EJ actions must treat Tribes as sovereign nations with self-determination first and part of the EJ community second.

The EPA previously has stated that related proposed and finalized rulemaking actions regarding oil and natural gas regulation would have no Tribal implications. The NTAA strongly disagreed with this position.[6] AI/AN populations suffer disproportionately from health

[4] "The order formalizes President Biden's commitment to make environmental justice a part of the mission of every agency by directing federal agencies to develop programs, policies, and activities to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities." White House Briefing Room, FACT SHEET: President Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Abroad, Create Jobs, and Restore Scientific Integrity Across Federal Government (Jan. 27, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/27/fact-sheet-president-biden-takes-executive-actions-to-tackle-the-climate-crisis-at-home-and-abroad-create-jobs-and-restore-scientific-integrity-across-federal-government/.

[5] EPA Press Office, EPA Administrator Announces Agency Actions to Advance Environmental Justice (Apr. 7, 2021), https://www.epa.gov/newsreleases/epa-administrator-announces-agency-actions-advance-environmental-justice.

[6] The NTAA has submitted comments on the following prior related rulemakings and the EPA should consider these comments when formulating, proposing, and finalizing new oil and natural gas methane standards: Comments on EPA's Proposed Rule: Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration, November 25, 2019, Comments on EPA's Proposed Rule: Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Source Reconsideration, December 17, 2018, Comments on EPA's Proposed Rule: Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, November 18, 2015, Comments on EPA's Proposed Rule: Review of New Sources and Modifications in Indian Country: Federal Implementation Plan for Managing Air Emissions from True Minor Sources Engaged in Oil and Natural Gas

discrepancies that leave them more vulnerable to impacts from pollution. This was often not acknowledged in the EPA rulemaking analysis. Not only has the EPA ignored these implications in the past, but it frequently has not offered Tribal consultation in related proposals, in direct disregard for Executive Order 13,175.

Courts have long recognized the federal trust responsibility,[7] as have Congress and federal agencies, including EPA. EPA issued its Indian Policy in 1984,[8] and has reaffirmed it ever since.[9] In its Indian Policy, EPA recognizes the federal trust responsibility and states it will "give special consideration to Tribal interests in making Agency policy, and to insure the close involvement of Tribal Governments in making decisions and managing environmental programs affecting reservation lands."[10] On January 26, 2021, President Biden issued a Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships committing to honoring Tribal sovereignty and including Tribal voices in policy deliberation that affects Tribal communities. The EPA must take this commitment seriously in developing, finalizing, and implementing regulations for the oil and natural gas industry.

NTAA Policy Recommendations

As explained in its November 25, 2019, comments, the NTAA opposed the policy amendments to the Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, which were finalized on September 14, 2020, largely as proposed.[11] Those changes were a step backwards for air quality and human health in Tribal communities and throughout the United States. While the NTAA is pleased that those changes were recently rescinded by a Congressional Review Act resolution, functionally returning to the 2016 new source performance standards for methane emission controls, the EPA must go further than the 2016 regulations for new sources, and must issue strong guidelines for existing sources, which should have been issued and implemented already.

The control of methane, VOC, and HAP emissions from existing sources on Tribal, federal, and state land is a key concern of NTAA's. The NTAA is disappointed that the EPA essentially wasted four years by refusing to move forward with its information collection request and

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Production in Indian Country, November 18, 2015, and NTAA Letter on Methane Regulation Needed in the Oil and Natural Gas Industry, December 9, 2014.

[7] *See, e.g.*, *Seminole Nation v. United States*, 316 U.S. 286, 296-97 (1942) (United States has "moral obligations of the highest responsibility and trust").

[8] EPA Policy for the Administration of Environmental Programs on Indian Reservations, William D. Ruckelshaus (Nov. 8, 1984), https://www.epa.gov/sites/production/files/2015-04/documents/indian-policy-84.pdf.

[9] *See, e.g.*, Reaffirmation of the U.S. Environmental Protection Agency's Indian Policy, E. Scott Pruitt (Oct. 11, 2017), https://www.epa.gov/sites/production/files/2018-03/documents/11oct17_epa_reaffirmation_pruitt.pdf.

[10] EPA Policy for the Administration of Environmental Programs on Indian Reservations, William D. Ruckelshaus, at 1 (Nov. 8, 1984), https://www.epa.gov/sites/production/files/2015-04/documents/indian-policy-84.pdf.

[11] Comments on EPA's Proposed Rule: Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration, November 25, 2019, https://secureservercdn.net/198.71.233.47/7vv.611.myftpupload.com/wp-content/uploads/2019/12/11.25.19-NTAA-Comment-Letter-on-NSPS-for-ONG.pdf.

emissions guidelines for existing sources following finalization of the 2016 methane new source performance standards. The NTAA supports the EPA's current plan to propose emission guidelines for existing sources in the oil and natural gas sector. This action is required by Clean Air Act Section 111(d) and EPA's implementing regulations 40 C.F.R. part 60, subpart B. The NTAA urges the EPA to propose and finalize these guidelines as soon as possible so that the guidelines can be implemented.

Importantly, the EPA must recognize that its obligations with respect to controlling methane, VOCs, and other harmful pollutants from oil and natural gas sources does not end with the promulgation of new source performance standards, nor does it end with the issuance of emissions guidelines. To achieve the necessary emissions reductions and protect Tribal communities from harmful air pollution, the EPA must provide assistance and resources, including funding, to Tribes, if they want it, to develop and implement plans and/or permitting programs. The EPA must assure that Tribal communities are not left behind dealing with harmful emissions from unregulated existing oil and natural gas sources. Additionally, with respect to Tribes that have standards or requirements in place prior to finalizing this rulemaking, the EPA should start working with them now to promote consistency and ease of implementation.[12]

Since 2016, scientific understanding of the methane, VOC, and HAP emissions from the oil and natural gas industry and the impact of those emissions has grown and that increased knowledge both heightens the urgency of more stringent regulation and informs effective regulations for reducing emissions from new and existing sources. The EPA's rulemaking should be guided by the following facts:

1. Based on aerial and other top-down emission data and modeling, EPA has historically underestimated methane emissions from the oil and natural gas industry and the sources' emissions are likely causing even more harm than previously believed.
2. Emissions can occur across the entire sector so regulations must have comprehensive coverage including in the production, processing, storage, and transmission segments.
3. Marginal wells can have high methane emissions and should be included within programs such as fugitive emissions leak detection and repair (LDAR).
4. The distribution of emissions rates is skewed so the speed of detecting and stopping large emission sources is critical for reducing total emissions.
5. Since large emissions can be episodic, after a screening approach finds a high emitting site, follow-up surveys must not only look for ongoing leaks, but equipment and operational issues that could trigger high emission events.

EPA's rulemaking also must be based on the best available science and incorporate flexible, performance-based approaches that incentivize the continued development and use of

[12] *See, e.g.*, Intermountain Oil and Gas MMP Project, Indian Law, https://www.oilandgasbmps.org/laws/tribal/ (visited July 19, 2021); Navajo Nation, Draft General Permit for Non-Major Sources and Minor Modifications to Non-Major Sources in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector (August 26, 2020), *available at* https://webcache.googleusercontent.com/search?q=cache:dkVk548Y-ccJ:https://www.navajoepa.org/main/images/Draft%2520General%2520Permit%2520for%2520Oil%2520and%2520Natural%2520Gas%2520Sources%2520-%2520for%2520public%2520comment%252008262020.pdf+&cd=2&hl=en&ct=clnk&gl=us.

advanced technologies for detecting and reducing emissions. Additionally, in considering the "best system of emission reduction," the rulemaking should consider the more stringent yet cost-effective requirements and technologies that have been proposed and/or implemented by states and Tribes since 2016.

As a key feature of upcoming rulemaking, the NTAA recommends that the EPA propose strong and frequent fugitive emissions LDAR requirements that remove the numerous exemptions present in the currently effective requirements for methane and VOC. All components with the potential to emit any fugitive emissions should be subject to LDAR requirements or equally protective inspection and monitoring requirements. This includes low production wells and well-head only well sites, which can emit fugitive emissions, as well as pneumatic devices that are designed to vent as part of normal operations, which can emit fugitive emissions beyond their designed quantity.[13]

The NTAA also recommends that the EPA not treat all emissions control options equally. Throughout the various control requirements, routing of potential emissions for 100% recovery and productive use should be the default required method of control. Only if that is not technically feasible, should combustion be allowed. As combustion wastes valuable resources and produces carbon dioxide and HAPs even when operating properly, the EPA should aim to minimize its use as much as possible. And the EPA should require that if a combustion device is used, it achieves a maximum destruction efficiency through a monitoring system that continuously indicates proper operation. Finally, only during limited emergencies should uncontrolled venting occur, and the EPA should require immediate reporting to justify the emergency. With respect to any option besides 100% recovery, the EPA must require and review recordkeeping and reporting to assure that option is justified and the EPA must be prepared to enforce these requirements.

Relatedly, the NTAA recommends that the EPA implement a default requirement of zero-bleed pneumatic equipment that do not vent emissions at all oil and natural gas sources. Only if the owner or operator demonstrates that zero-bleed is not technically feasible, which must be justified, should the EPA allow low-bleed pneumatic equipment. As explained above, any non-zero bleed pneumatic equipment should be subject to fugitive emissions LDAR requirements.

The NTAA also recommends that the EPA include requirements to minimize or eliminate emissions from wells once they have reached the end of their productive life.

Finally, the NTAA recommends that EPA require compliance data be reported frequently in an easy-to-use and publicly available format, so that the public can monitor and understand the emission sources impacting them. The EPA must also be prepared to enforce the requirements.

The NTAA appreciates this opportunity to submit this pre-proposal comment and looks forward to further work with the EPA on this important issue. If you have any questions or require clarification from NTAA, please do not hesitate to contact NTAA's Project Director, Andy Bessler, at 928-523-0526 or andy.bessler@nau.edu.

[13] As explained below, the EPA should also eliminate or reduce the use of these types of devices unless it is not technically feasible.

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Sincerely,

Carol Kriebs
Chairwoman
National Tribal Air Association's
Executive Committee

Cc; Tomas Carbonell, OAR
Tina Ndoh, OAQPS
Pat Childers, OAR

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 10/22/2021 3:22:15 PM
To: Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: EO12866 Oil and Gas Climate Review (AV15 & AV16) - Preamble Pass Back

Thank you Kevin!

From: Culligan, Kevin <Culligan.Kevin@epa.gov>
Sent: Thursday, October 21, 2021 11:35 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: Fwd: EO12866 Oil and Gas Climate Review (AV15 & AV16) - Preamble Pass Back

Sent from my iPhone

Begin forwarded message:

From: "Marsh, Karen" <Marsh.Karen@epa.gov>
Date: October 19, 2021 at 4:58:49 PM EDT
To: "Hodson Marten, Elke L. EOP/OMB" <Elke.L.HodsonMarten@ Ex. 6 Personal Privacy (PP) >
Cc: "Culligan, Kevin" <Culligan.Kevin@epa.gov>, "Cozzie, David" <Cozzie.David@epa.gov>, "Iglesias, Amber" <Iglesias.Amber@epa.gov>, "Adams, Darryl" <Adams.Darryl@epa.gov>, "Gilbreath, Jan" <Gilbreath.Jan@epa.gov>, "Lassiter, Penny" <Lassiter.Penny@epa.gov>, "Sasser, Erika" <Sasser.Erika@epa.gov>, "Hambrick, Amy" <Hambrick.Amy@epa.gov>
Subject: EO12866 Oil and Gas Climate Review (AV15 & AV16) - Preamble Pass Back

Elke,

Please find attached two (2) files for the updated preamble for the oil and gas climate review proposals (AV15 and AV16). These attachments include: (1) clean updated preamble word file, and (2) RLSO updated preamble word file compared to the 9/17 submission and comments received from interagency reviewers.

As discussed yesterday, this preamble reflects responses to interagency comments in addition to several substantive changes EPA has made to the standards for fugitive emissions, pneumatic controllers, and oil wells with associated gas.

Ex. 5 Deliberative Process (DP)

Additionally, a few comments were provided via email and outside of the preamble itself. Responses to those comments are provided here.

OMB Comments From Email/Separate Document

Ex. 5 Deliberative Process (DP)

EPA RESPONSE 1

Ex. 5 Deliberative Process (DP)

COMMENT 2

Ex. 5 Deliberative Process (DP)

EPA RESPONSE 2

Ex. 5 Deliberative Process (DP)

Let me know if you have any questions.
Thanks,
Karen

****

Karen R. Marsh, PE
US EPA, OAQPS, Sectors Policies and Programs Division
Fuels and Incineration Group
109 TW Alexander Drive, Mail Code E143-05
Research Triangle Park, NC 27711
Direct: (919) 541-1065; email: marsh.karen@epa.gov

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 4/2/2021 10:10:41 PM
To: Sarofim, Marcus [Sarofim.Marcus@epa.gov]; Gunning, Paul [Gunning.Paul@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]
CC: Birnbaum, Rona [Birnbaum.Rona@epa.gov]
Subject: RE: Methane CRA docs revised

Thank you Marcus, very helpful! When I first looked at the table I had surmised we were using the last approach (0.97/2.64). But the different approach and rationale you've provided make total sense and I appreciate the careful explanation. Best,

Tomás

From: Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Sent: Friday, April 2, 2021 4:07 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>
Cc: Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane CRA docs revised

Good afternoon Tomás et al.,

Ex. 5 Deliberative Process (DP)

[1] *Id.*, Supplementary Material at Table 8.SM.6, pg. 8SM-13 Table 8.SM.6, pg. 8SM-13, https://www.ipcc.ch/site/assets/uploads/2018/07/WGI_AR5.Chap_.8_SM.pdf

Ex. 5 Deliberative Process (DP)

I hope that explains the math behind the statement, and I also hope the reasoning behind my preferred metric makes sense.

Have a good weekend,

-Marcus

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Friday, April 02, 2021 3:35 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>
Cc: Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane CRA docs revised

Absolutely Tomás. I am looping in Marcus to help with the explanation (there is no one better!)

Have a great weekend as well.

Paul

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Friday, April 2, 2021 3:31 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>
Subject: FW: Methane CRA docs revised
Importance: High

Ex. 5 Deliberative Process (DP)

Tomás

From: Hoffer, Melissa <Hoffer.Melissa@epa.gov>
Sent: Monday, March 22, 2021 6:00 PM
To: Hogan, Stephanie <Hogan.Stephanie@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>; Vijayan, Abi <Vijayan.Abi@epa.gov>; Mills, Derek <Mills.Derek@epa.gov>; Branning, Amy <Branning.Amy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>
Subject: RE: Methane CRA docs revised
Importance: High

Hi all,

I have revised this statement fairly substantially, including formatting it to move the long cites and urls to footnotes, move the caselaw discussion to the authority section, clean up the typos and proof. I therefore did not track my changes. You will see I noted a few places where additional citation is needed. The draft needs to be checked to ensure we use the defined term for the 2020 rule each time (I tried to catch all of these).

Stephanie, you may need to integrate your further edits here.

Please take a final look. I'd ask that you limit your edits at this point to correcting any inaccuracies. We need to get this to our WH colleagues asap. I will be off line until 7:00; please have final form to me by then.

Joe/Tomas, please take a final look.

Thanks. M

From: Hogan, Stephanie <Hogan.Stephanie@epa.gov>
Sent: Monday, March 22, 2021 5:28 PM
To: Hoffer, Melissa <Hoffer.Melissa@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>; Vijayan, Abi <Vijayan.Abi@epa.gov>; Mills, Derek <Mills.Derek@epa.gov>; Branning, Amy <Branning.Amy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>
Subject: RE: Methane CRA docs revised

Melissa, Tomás, & Joe,

Ex. 5 Attorney Client (AC)

Stephanie L. Hogan | Assistant General Counsel for the NSPS and Visibility Protection Practice Group | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | phone: (202) 564-3244 | fax: (202) 564-5603

Pronouns: she/her/hers

From: Hogan, Stephanie
Sent: Monday, March 22, 2021 4:23 PM
To: Hoffer, Melissa <Hoffer.Melissa@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>; Vijayan, Abi <Vijayan.Abi@epa.gov>; Mills, Derek <Mills.Derek@epa.gov>; Branning, Amy <Branning.Amy@epa.gov>
Subject: RE: Methane CRA docs revised

Melissa – we can circle back ASAP to the OAR staff who responded your comments on these topics.

Stephanie L. Hogan | Assistant General Counsel for the NSPS and Visibility Protection Practice Group | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | phone: (202) 564-3244 | fax: (202) 564-5603

Pronouns: she/her/hers

From: Hoffer, Melissa <Hoffer.Melissa@epa.gov>
Sent: Monday, March 22, 2021 4:14 PM
To: Marks, Matthew <Marks.Matthew@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hogan, Stephanie <Hogan.Stephanie@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>; Vijayan, Abi <Vijayan.Abi@epa.gov>; Mills, Derek <Mills.Derek@epa.gov>; Branning, Amy <Branning.Amy@epa.gov>
Subject: RE: Methane CRA docs revised

Thanks.

Ex. 5 Attorney Client (AC)

M

From: Marks, Matthew <Marks.Matthew@epa.gov>
Sent: Monday, March 22, 2021 4:01 PM
To: Hoffer, Melissa <Hoffer.Melissa@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hogan, Stephanie <Hogan.Stephanie@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>; Vijayan, Abi <Vijayan.Abi@epa.gov>; Mills, Derek <Mills.Derek@epa.gov>; Branning, Amy <Branning.Amy@epa.gov>
Subject: Methane CRA docs revised

Hi Melissa, Joe, and Tomas,

Here are revised clean and redlined versions that address Melissa's and Tomas's comments. The redlined versions provide responses to comment bubbles. Also included below is a potential insert for your consideration re: the SCF. Gautam and I discussed it with Melissa earlier, so she can help explain its purpose. Would do that here, but wanted to send the attachments as quickly as we could. Sorry again for the delay.

Matt

Ex. 5 Attorney Client (AC)

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Message

From: Weaver, Susannah [Weaver.Susannah@epa.gov]
Sent: 9/7/2021 4:27:02 AM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: RE: 20-year GWP

Ex. 5 AC/DP

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Saturday, September 4, 2021 2:07 PM
To: Weaver, Susannah <Weaver.Susannah@epa.gov>
Subject: 20-year GWP

Ex. 5 AC/DP

Tomás

Message

From: Gunning, Paul [Gunning.Paul@epa.gov]
Sent: 10/7/2021 1:30:39 PM
To: Martinich, Jeremy [Martinich.Jeremy@epa.gov]; Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]; Ford, Sharon [Ford.Sharon@epa.gov]
CC: Fawcett, Allen [Fawcett.Allen@epa.gov]; Irving, Bill [Irving.Bill@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Desai, Mausami [Desai.Mausami@epa.gov]
Subject: RE: methane GWP memo

This is great and thanks again for pulling this together. I would like to get together to talk through the following policy

Ex. 5 Deliberative Process (DP)

Sharon – can you please set up a 30 min discussion with this group. Thank you.

Paul

From: Martinich, Jeremy <Martinich.Jeremy@epa.gov>
Sent: Monday, October 4, 2021 11:48 AM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Cc: Fawcett, Allen <Fawcett.Allen@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Subject: FW: methane GWP memo

Hi Paul,

Marcus (with help from Melissa and Mausami) have put together the attached memo on GWPs to respond to issues that are increasingly being raised by others [Allen, Bill, and I have reviewed]. This became a longer document than originally envisioned, and can be shorted if needed, but it covers the main arguments.

Thanks,
Jeremy

Message

From: Sarofim, Marcus [Sarofim.Marcus@epa.gov]
Sent: 10/14/2021 1:42:52 PM
To: Gunning, Paul [Gunning.Paul@epa.gov]; Martinich, Jeremy [Martinich.Jeremy@epa.gov]; Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]; Fawcett, Allen [Fawcett.Allen@epa.gov]; Irving, Bill [Irving.Bill@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Desai, Mausami [Desai.Mausami@epa.gov]
Subject: Methane GWPs
Attachments: GWPs In Context.clean.docx

Good morning,

There has been interest in the continued use of the 2007 IPCC AR4 GWP estimates in the proposed Oil & Gas Rule (e.g., see the email from Lester Wyborny below). Here are some of the relevant considerations underlying the decisions to continue use of AR4 numbers:

Ex. 5 Deliberative Process (DP)

Thank you,

-Marcus Sarofim

From: "Wyborny, Lester" <wyborny.lester@epa.gov>
Date: April 11, 2021 at 7:32:07 PM EDT
To: "Grundler, Christopher" <grundler.christopher@epa.gov>
Subject: Why wouldn't EPA move to the AR5 GWP values for methane?

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Lester

-----Original Appointment-----
From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Friday, October 8, 2021 9:37 AM
To: Gunning, Paul; Martinich, Jeremy; Schmeltz, Rachel; Fawcett, Allen; Irving, Bill; Weitz, Melissa; Desai, Mausami
Cc: Sarofim, Marcus
Subject: Methane GWP Memo
When: Thursday, October 14, 2021 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

-----Original Appointment-----
From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Thursday, October 7, 2021 10:11 AM
To: Gunning, Paul; Martinich, Jeremy; Schmeltz, Rachel; Fawcett, Allen; Irving, Bill; Weitz, Melissa; Desai, Mausami
Subject: Methane GWP Memo
When: Thursday, October 14, 2021 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams meeting

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On Global Warming Potentials

How they've been updated in AR6, why we still use AR4 GWPs, and why the 100-year time frame is strongly preferred

What is a Global Warming Potential?

Mathematically, the GWP is the integrated radiative forcing resulting from a pulse of emissions of a greenhouse gas, relative to the same forcing resulting from a pulse of emissions of the same mass of carbon dioxide. It is calculated against a constant background concentration. An important thing to realize is that because the GWP is a relative measure, if the GWP of one gas increases due to a timescale change, then that is equivalent to reducing the GWP of CO_2.

The GWP was developed to allow comparisons of the global warming impacts of different gases, and to facilitate adoption of mitigation measures for non-CO_2 GHGs by governments. This paralleled the development of Ozone Depletion Potentials for CFCs under the Montreal Protocol. The most widely cited GWPs are those presented in IPCC assessment reports.

A reasonable way to think about the GWP is that it is the amount of energy that is added to the earth system because of a pulse of emissions of a gas (relative to CO_2), over the time period considered. For example, a 100-year GWP for methane of 27.2 means that a ton of methane emitted at the same time as a ton of CO_2 would have in total 27.2 times the warming effect as that ton of CO_2 over a one-hundred-year time frame. A 20-year GWP for methane of 80.8 means that a ton of methane emitted at the same time as a ton of CO_2 would have in total 80.8 times the warming effect of as that ton of CO_2 over a 20-year time frame. This is because methane is a strong ghg but decays much faster than other gases. Methane is destroyed within 10-20 years after being emitted, whereas the concentration perturbation from CO_2 emissions persists for hundreds of years. Using a 20-year GWP would ignore any radiative forcing impacts after the first 20 years. Because of the inertia of the ocean, temperature effects are delayed relative to concentration/radiative forcing: the temperature effect of methane peaks about 10 years after emissions and then start declining, whereas CO_2 temperature effects peak about 20 years after emissions and remain nearly constant thereafter (see Figure 2).

Figure 1[1]: concentration over time resulting from a pulse of emissions of each gas. Figure 2[2]: temperature over time from a pulse the size of one year of human emissions of each gas.

[1] Bergman, R, 2012, The effect on climate change impacts for building products when including the timing of greenhouse gas emissions

[2] IPCC AR5, WGI, Figure 8.33

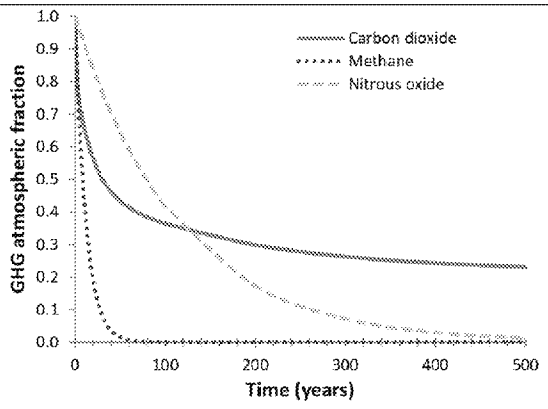


Figure 1

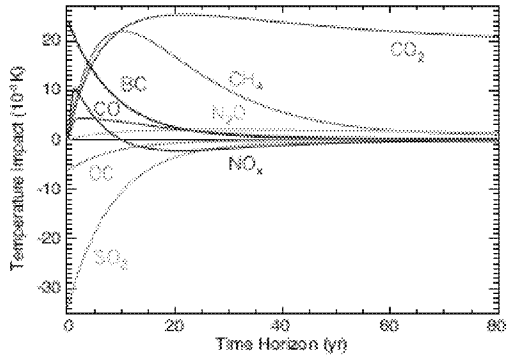


Figure 8.33 | Temperature response by component for total anthropogenic emissions for a 1-year pulse. Emission data for 2008 are taken from the EDGAR database and for BC and OC for 2005 from Shindell et al. (2012a). There are large uncertainties related to the AGTP values and consequentially also to the calculated temperature responses (see text).

Figure 2

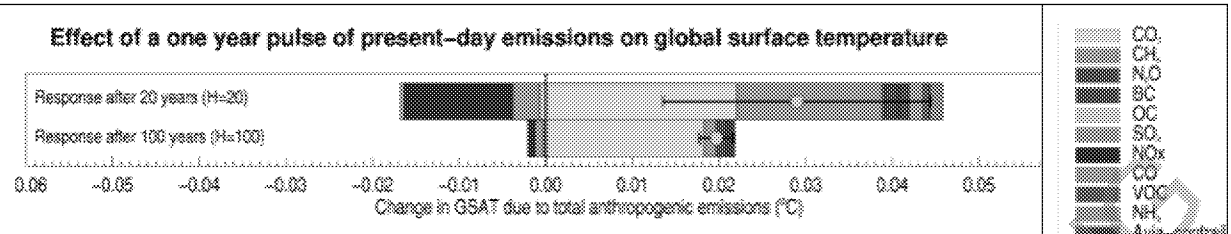


Figure 3

Figure 3[3]: Temperature change at 20 years and 100 years after a pulse the size of one year of human emissions of each gas (same concept as Figure 2, different presentation).

How have GWPs changed since AR4?

Each IPCC assessment reviews peer-reviewed literature and updates GWPs. Changes in GWP values can be due to updated science about their radiative efficiency (which for some gases is also a function of background concentrations of that gas), their lifetime, or indirect effects of the gas. Between AR4 and AR6 there was also a discussion of climate-carbon (cc) feedbacks (see below).

GWP100	AR4 (no cc)	AR5-no-cc	AR5-cc	AR6 (cc)
CO_2	1	1	1	1
CH_4-fossil		30	36	29.8
CH_4-non-fossil	25	28	34	27.2
N_2O	298	265	298	273
HFC-134a	1430	1300	1550	1526

[3] IPCC AR6, WGI, Figure 6.16

SF_6	22800	23500	26087	25200

Including the climate-carbon feedback means taking into account the effect that a changing climate has on the carbon cycle. AR4 GWPs were calculated with climate-carbon feedbacks included for CO2, but not for non-CO_2 GHGs. This inconsistent treatment of climate-carbon feedbacks can lead to underweighting the non-CO_2 GHGs relative to their actual impacts. AR5 presented GWPs without climate-carbon feedbacks for the non-CO_2 GHGs in order to be consistent with AR4, but also presented estimates including climate-carbon feedbacks, showing that only including climate-carbon feedbacks for CO_2 leads to underweighting non-CO_2 gases by around 10 to 20 percent. Because the latter were based on a single study, even though they were more scientifically internally consistent, they were not considered the primary AR5 estimates. The publication of more studies using climate-carbon feedbacks for all gases, and the determination that this consistent approach was superior, led AR6 to include the climate-carbon feedbacks for all gases in the only GWP that was presented.

AR5 and AR6 also included two values for methane, depending on whether or not the methane is of fossil origin. For discussions of climate impact, it would generally make sense to use the fossil value for methane of fossil origin. However, for purposes of emission inventories, there are potential complications with double counting if the methane carbon is already accounted for in the CO_2 inventories.

Note that while the CO_2 GWP is smaller than the GWP for the other GHGs, it is emitted in much larger quantities, such that it is the most important gas in terms GWP weighting or in terms of attributable climate impact (this is why CO_2 is used as the reference gas for GWPs).

Finally, it is important to recognize that there is uncertainty in the GWP estimates based on uncertainties in the radiative forcing, lifetimes, climate-carbon feedbacks, and other aspects of the calculations: for methane, the 90% uncertainty range for the GWP100 value is 40%, or +/- 11 for the 27.2 estimate.

Use of the IPCC AR4 values

In accordance with the practice of the EPA GHGI, the EPA GHGRP, and international reporting standards under the UN Framework Convention on Climate Change (UNFCCC), the 2007 IPCC Fourth Assessment Report value of the methane 100-year GWP is currently used for weighting emissions for purposes of emissions reporting. Parties to the UNFCCC periodically consider and agree to updates to the GWP for national-level reporting of GHG data to the UNFCCC. It is important for comparability of emissions reporting between countries and programs that a consistent GWP is used. It is likely that the UNFCCC will consider updating the specified reporting GWPs in the next few years and EPA will update the GWP it uses for emissions reporting following that process. Note that the nature of commitments to GHG targets can be altered when the GWP used to measure the commitment changes – see the example on "Implications of GWP and Atmospheric Lifetimes for Mitigation" section below.

Note that both the GHGI, GHGRP, and UNFCCC present emissions in tons of unweighted gas in addition to GWP-weighted values, and the GHGI also in report annexes includes emissions weighted by other GWPs (e.g. from other assessment reports).

The GWP timeframe

The IPCC First Assessment Report (1992) considered three time horizons for the GWP – 20 years, 100 years, and 500 years. The 100-year timeframe quickly became the primary timeframe of use – while the WMO (author of first IPCC assessment report) in 1992 argued that the 100-year period was a balanced representation of various time periods, other authors (e.g., the IPCC AR5 report) argued that there is no scientific argument for selecting 100 years. However, recent research (Sarofim & Giordano, 2018, and Mallapragada & Mignone, 2020) has shown that if the net total of damages to society is considered the relevant metric, it is possible to equate the GWP time horizon to those damages by using a discount rate. Because the discount rate is the typical approach for economic analyses to weigh impacts in different time periods, this is a useful translation. Sarofim and Giordano (2018) estimated future damages from a pulse of CO_2 emissions compared to a pulse of CH_4 emissions and calculated the GWP time horizon that would produce the same ratio between CO_2 and CH_4. Based on this analysis, using the 100-year GWP is equivalent to using a discount rate just above 3%, and the 20-year GWP is equivalent to a discount rate on the order of 12%. A discount rate of 3% is consistent with many economic analyses of future damages and damages avoided, including those used in EPA rulemaking.

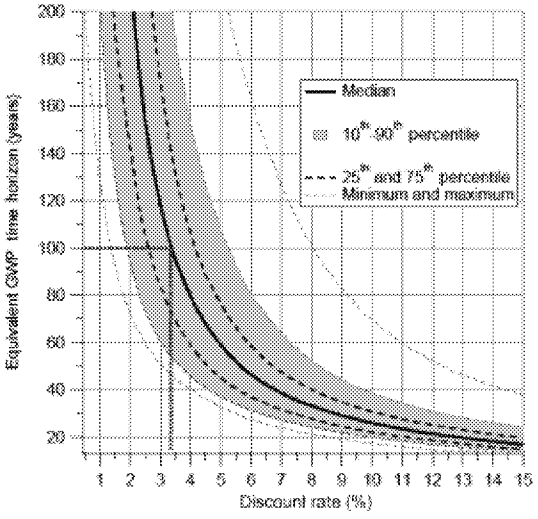


Figure 2. GWP timescales consistent with discount rates based on consistency of the GWP ratio with the ratio of net present damages of CH_4 and CO_2, including the interquartile and interdecile bands and maximum and minimum values based on a sensitivity analysis.

AR6 GWPs	20-year GWP	100-year GWP
CO_2	1	1
CH_4-fossil	82.5	29.8
CH_4-non-fossil	80.8	27.2
N_2O	273	273
HFC-134a	4144	1526
SF_6	18300	25200

Radiative forcing components:

The instantaneous radiative forcing of 1 ppm of any of these gases can be compared to CO_2. A ppm of CH_4 would have about 30 times the effect of a ppm of CO_2. On a mass basis, the basis typically used in reporting GHG emissions, the ratio of instantaneous forcing is closer to 80. Taking into account indirect effects on ozone and stratospheric water vapor would increase the ratio by another 45%. Therefore methane starts out about 115 times as effective a warmer as CO_2 by mass... but because it has a much shorter lifetime, over 100 years it only contributes about 27 times the amount of heat to the climate system, because it is only present for 10-20 years before decaying and having little impact over the remaining 8 decades.

Alternate Approaches to GWP

An alternate approach is the novel GWP* which actually aims for a more physical climate equivalence but requires comparing a pulse of CO_2 to sustained changes in methane emissions.

Another alternate metric is the Global Temperature Potential (GTP). While the GWP is a measure of the heat absorbed over a given time period due to emissions of a gas, the GTP is a measure of the temperature change at the end of that time period (again, relative to CO_2).The calculation of the GTP is more complicated than that for the GWP, as it requires modeling how much the climate system responds to increased concentrations of GHGs (the climate sensitivity) and how quickly the system responds (based in part on how the ocean absorbs heat). The GTP can either be used with a constant time horizon (e.g., the GTP-100), or with a time horizon that is defined by a target year, such that the GTP would be recalculated every year until that target year is reached.

The ratio between the SC-CH_4 and the SC-CO_2 is another way to look at the relative impact of these gases.[4] This ratio is 29 for emissions in 2020 using a 3% discount rate, very similar to the 100-year GWP as consistent with the discount rate analysis above (despite inclusion of carbon fertilization reducing the relative impact of CO_2). Sensitivity analyses show an increase in this ratio for emissions in later years (to 36 for emissions in 2050) and for higher discount rates (48 for 5%), and a decrease for lower discount rates (26 for 2.5%).

Implications of GWP and Atmospheric Lifetimes for Mitigation

The implications of a choice of GWP for mitigation depends on the structure of the policy. Is there a cap and trade in effect? Are reductions relative to a baseline year? Or is the GWP just used in an illustrative fashion?

For example, consider the US target of a 50% reduction from 2005 levels. In 2005, the US emitted 6,135 MMT of CO_2, and 27.4 MMT of CH_4. For this exercise, 2005 baseline levels will be calculated with both 20-year and 100-year GWPs, and then 2030 emissions that meet the 50% reduction target will be calculated under varying assumptions regarding the percentage of methane reduced.

		2030 Emissions by percent CH_4 mitigation			
100-year GWP	2005	Zero	50%	75%	100%
CO_2	6135	2697	3068	3253	3438
CH_4	741	741	370	185	0
Total	6876	3438	3438	3438	3438

[4] The social cost of carbon (SC-CO2) and the social cost of methane (SC-CH4) are respectively the monetized discounted value of the stream of future worldwide damages from an incremental one ton increase in carbon dioxide (CO2) or methane (CH4) emissions in a given year. Calculating these values involves four modules, a socioeconomic module that projects a future emissions path, a climate module that evaluates the global temperature change and sea level rise from that emissions path, a damages module that calculates the monetized future damages from the climate module outputs, and a discounting module discounts the stream of future damages and sums them to a single present value.

		2030 Emissions by percent CH_4 mitigation			
20-year GWP	2005	Zero	50%	75%	100%
CO_2	6135	1970	3068	3891	4165
CH_4	2196	2196	1098	274	0
Total	8331	4165	4165	4165	4165

Adopting a shorter timeframe for the GWP will almost always lead to more methane reduction because it is valued more highly. Generally, it will also lead to less CO_2 reduction assuming a constant allocation of resources to the climate problem: however, what this exercise shows is that reduced CO_2 mitigation could be dramatic under a policy based on reductions relative to a historic baseline, if methane reductions exceed the average reduction target (in this case 50%). This is another illustration how the relative nature of the GWP can work.

Two alternate framings

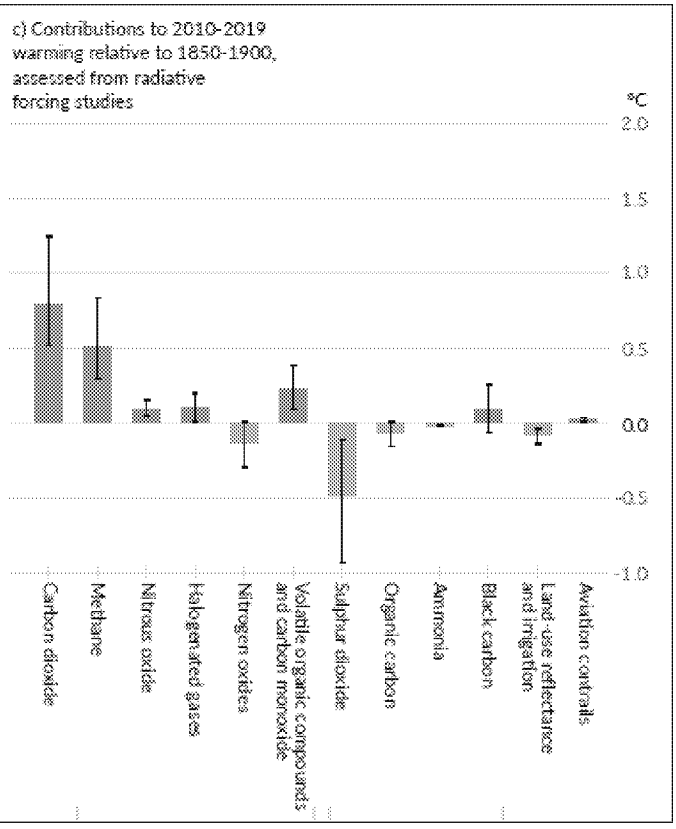
Methane as the reference gas: because CO_2 is the reference gas for the standard GWP, moving from a GWP-100 to a GWP-20 just seems like a way to accentuate the importance of methane in the short term. But what if methane was the reference gas, with a "methane-GWP" of 100 at any timescale? Then moving from a 100-year timescale to a 20-year timescale would lead to a reduction in the methane-GWP of CO_2 from a value of 3.7 for the methane-GWP-100 to a value of 1.2 for a methane-GWP-20.

Methane-10: If there was a hypothetical substance with 10 times the forcing of methane, but whose lifetime is also ten times shorter, what would be the appropriate GWP timescale? On a 20-year or 100-year timescale, this methane-ten would have about the same GWP as methane, but on a 2-year timescale, it would have a GWP of 800. Would adopting a 2-year GWP be reasonable?

Attributing Temperature Change to GHGs:

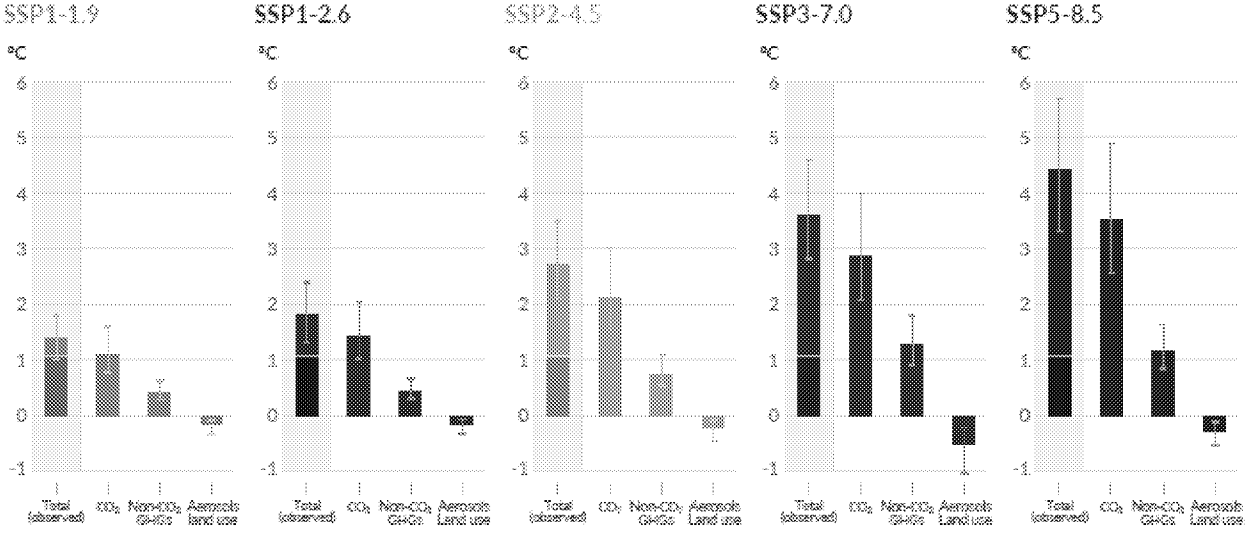
The figure to the right (IPCC AR6 WGI Figure SPM.2c) shows that while CO2 has contributed more to warming over the past century than any other human-emitted substance, methane contributed about 1/3rd of the total GHG-induced warming effect. (not shown: the best estimate is that the was zero net contribution to warming of natural factors like solar variability, volcanoes, or internal variability)

However, the figure below (IPCC AR6 WGI Figure SPM.4) shows that in all 5 major scenarios considered by the IPCC, the relative role of CO_2 grows over time because of the way that it accumulates in the atmosphere relative to shorter lived substances like methane or aerosols.



b) Contribution to global surface temperature increase from different emissions, with a dominant role of CO_2 emissions

Change in global surface temperature in 2081-2100 relative to 1850-1900 (°C)



Total warming (observed warming to date in darker shade), warming from CO_2, warming from non-CO_2 GHGs and cooling from changes in aerosols and land use

Stabilization of Climate

Because carbon is not destroyed, but merely moved between the oceanic, terrestrial, and atmospheric carbon pools, emitting a ton of carbon (particularly fossil carbon) effectively leads to a permanent

increase in global temperatures. Therefore, in order to stabilize climate, global carbon dioxide emissions must eventually reach net zero.

In contrast, for a short-lived gas like methane, concentrations will stabilize about 20 years after emissions stabilize. Therefore, it is not necessary to reach zero emissions for methane in order to stabilize climate. However, the higher the constant emissions of methane, the higher the stabilized concentration of methane, and therefore the higher the temperature at which stabilization occurs.

The figure below shows in a stylized fashion that constant methane emissions lead to a constant climate impact, whereas constant carbon dioxide emissions lead to continual warming.

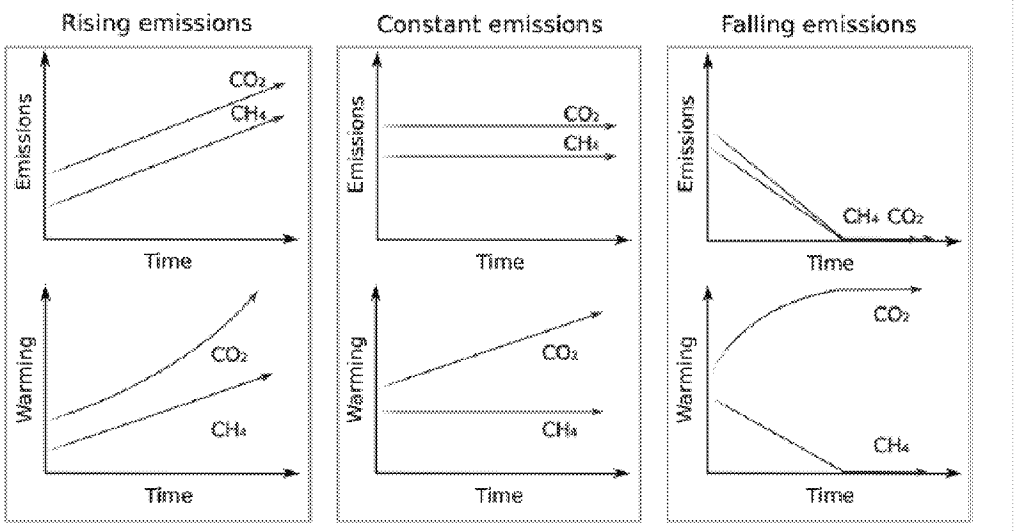


Figure showing three paired methane and carbon dioxide emissions scenarios, with the corresponding stylized warming resulting below.

Methane and Tipping Points

One argument for using the 20-year GWP in order to prioritize methane mitigation is that methane mitigation is necessary in order to reduce near-term warming and thereby avoid tipping points, whereas carbon dioxide mitigation is important for long-term warming but does not have near-term benefits. There are two misconceptions here.

The first misconception is that methane mitigation acts more quickly than carbon dioxide mitigation because of its shorter lifetime. This is untrue. If carbon dioxide emissions were reduced by 115 tons, the immediate impacts would be exactly as large as the impacts of reducing 1 ton of methane (this ratio is determined by the relative radiative forcing effect, see above discussion of radiative forcing components). The difference is that the effects of the carbon dioxide mitigation will persist for much longer than the effects of methane mitigation. However, there is a reason that methane mitigation can have a larger near-term effect – but it isn't due to the shorter lifetime, but rather to the tendency of

carbon dioxide mitigation to also reduce the emissions of co-emitted cooling aerosols. Reducing these aerosols leads to near-term warming which offsets the cooling due to the carbon dioxide reductions. So the two reasons that methane mitigation can have a larger near-term effect is because it is a more powerful radiative substance and because carbon dioxide mitigation also reduces cooling aerosols.

The second misconception is that methane mitigation should be prioritized in order to avoid tipping points. There are two kinds of tipping points: the ones that are related to absolute temperature thresholds, and the ones that are related to rate of change. For the first, prioritizing methane mitigation over carbon dioxide mitigation might delay when a tipping point is reached, at the cost of exceeding the tipping point by a larger margin later in time. For the second, methane mitigation will only reduce the peak rate of change when reduced in the decade before that peak rate is reached.[5]

If there is concern about tipping points, the answer is not to use a 20-year GWP in order to prioritize methane mitigation, it is to adopt a more ambitious GHG mitigation target in order to reduce both methane and carbon dioxide more aggressively (but while still using 100-year GWPs).

Ozone-mediated health and agricultural effects resulting from methane emissions

It is also important to note that beyond the climate effect, some gases have other direct effects. CO_2 has ocean acidification and biogenic fertilization effects. N_2O has effects on stratospheric ozone. And CH_4 leads to ozone production, which leads to health and agricultural effects.

Sarofim, Waldhoff, and Anenberg estimated in 2015 that when valuing the mortality effects of this ozone, they would be of the same magnitude as SC-CH_4.

[5] "But it is important to be realistic about what near-term SLCP measures can actually achieve. It is tempting to claim that immediate action on SLCPs will contribute directly to a reduction in the overall risk of crossing potentially dangerous temperature thresholds. But unless we see a substantial turnaround in global CO_2 emission rates, such a claim would be untrue: if CO_2 emissions continue, near-term SLCP measures can delay the crossing of temperature thresholds, but they do not significantly influence eventual peak temperature rise any more than measures taken later. Nor do they reduce the peak rate of warming, unless these SLCP measures are carefully timed to coincide with peak LLCP emissions." Bowerman et al. 2013, [HYPERLINK "https://www.nature.com/articles/nclimate2034"]

Message

From: Gunning, Paul [Gunning.Paul@epa.gov]
Sent: 4/7/2021 3:13:52 PM
To: Irving, Bill [Irving.Bill@epa.gov]; Kocchi, Suzanne [Kocchi.Suzanne@epa.gov]; Sarofim, Marcus [Sarofim.Marcus@epa.gov]; Desai, Mausami [Desai.Mausami@epa.gov]
CC: Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]; Fawcett, Allen [Fawcett.Allen@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]
Subject: RE: Methane question

Excellent!! Thanks everyone for the quick turn.

Paul

From: Irving, Bill <Irving.Bill@epa.gov>
Sent: Wednesday, April 7, 2021 11:10 AM
To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

Here it is.

Ex. 5 Deliberative Process (DP)

From: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Sent: Wednesday, April 07, 2021 10:52 AM
To: Irving, Bill <Irving.Bill@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

Send a completed draft of the complete response and then Paul or I will cut and paste it to respond to Betsy.

From: Irving, Bill <Irving.Bill@epa.gov>
Sent: Wednesday, April 07, 2021 10:50 AM
To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
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Subject: RE: Methane question

Ex. 5 Deliberative Process (DP)

Suzie should we respond to Betsy or will you do that?

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Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

I agree, this response looks good and Marcus' addition is helpful. As for 20 vs 100, if we feel we need more to address can we just link to HDV RTC?

From: Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Sent: Tuesday, April 06, 2021 7:05 PM
To: Desai, Mausami <Desai.Mausami@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

I like Mausami's response, and it addresses the timeline question I raised in my previous email. I'm added a suggested

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

-Marcus

From: Desai, Mausami <Desai.Mausami@epa.gov>
Sent: Tuesday, April 06, 2021 6:54 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

Yes, we can have response by tomorrow. Just checking response sent to question sent from someone in R6 to our GHG inbox last week.

Here is a draft:

Ex. 5 Deliberative Process (DP)

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Tuesday, April 6, 2021 6:28 PM
To: Irving, Bill <Irving.Bill@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Subject: RE: Methane question

Thx. I told Betsy we could get her something COB tomorrow. If that is not possible, just let me know.

Thx.

From: Irving, Bill <Irving.Bill@epa.gov>
Sent: Tuesday, April 6, 2021 5:48 PM
To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Cc: Gunning, Paul <Gunning.Paul@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Subject: Re: Methane question

+Mausami who may have already responded to this person.

Sent from my iPhone

On Apr 6, 2021, at 5:39 PM, Kocchi, Suzanne <Kocchi.Suzanne@epa.gov> wrote:

Please see below. Can we draft up something short and sweet on this? Thanks.

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Tuesday, April 06, 2021 5:36 PM
To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Subject: RE: Methane question

Ex. 5 Deliberative Process (DP)

From: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Sent: Tuesday, April 6, 2021 5:04 PM
To: Shaw, Betsy <Shaw.Betsy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Subject: RE: Methane question

Ex. 5 Deliberative Process (DP)

Just wondering how formal of a write up do you need?

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Tuesday, April 06, 2021 4:54 PM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Subject: Methane question

Hi Chris, Suzie and Paul,

Following the Agency's Scientific Integrity Annual Meeting last week, Francesca Grifo received a query from an EPA employee about whether the global warming potential for methane would be updated. I told her I do some sleuthing and report back. Can you all provide any responses to the questions below? Appreciate any light you could shed.

Thanks,

Betsy

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Message

From: Sarofim, Marcus [Sarofim.Marcus@epa.gov]
Sent: 4/12/2021 4:21:01 PM
To: Gunning, Paul [Gunning.Paul@epa.gov]; Irving, Bill [Irving.Bill@epa.gov]; Fawcett, Allen [Fawcett.Allen@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]
CC: Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]
Subject: RE: Why wouldn't EPA move to the AR5 GWP values for methane?

I think the challenge here is that there are different numbers used for different purposes.

Ex. 5 Deliberative Process (DP)

-Marcus

History:
2012: (2017-2025 LDV rule): "As with the MY 2012-2016 Light Duty rule and the MY 2014-2018 Medium and Heavy Duty rule, the GWPs used in this rule are consistent with 100-year time frame values in the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4). At this time, the 100-year GWP values from the 1995 IPCC Second Assessment Report are used in the official U.S. GHG inventory submission to the United Nations Framework Convention on Climate Change (UNFCCC) per the reporting requirements under that international convention. The UNFCCC recently agreed on revisions to the national GHG inventory reporting requirements, and will begin using the 100-year GWP values from AR4 for inventory submissions in the future."

2016: (Phase 2 HD vehicle rule): "To be consistent with other lifecycle analyses, the agencies are continuing to use AR4 value of 25 for the methane GWP in our lifecycle analyses. However, as discussed in Chapter 13.1 of the RIA, we have also conducted sensitivity analyses using methane GWP values ranging from 7.6 to 72." And "GHG benefits of the program. EPA requested comments on updating GWPs used in the calculation of credits discussed above. For Phase 2, EPA is updating the GWP for methane from 25 to 34 based on IPCC AR5. Please see the full discussion of this issue provided in Sections II.D and XI.D."

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Monday, April 12, 2021 9:31 AM
To: Irving, Bill <Irving.Bill@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: FW: Why wouldn't EPA move to the AR5 GWP values for methane?

???

Ex. 5 Deliberative Process (DP)

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Sunday, April 11, 2021 9:23 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>
Subject: Re: Why wouldn't EPA move to the AR5 GWP values for methane?

Hi Lester, it's great to hear from you. I dont now what happened in 2017 but I will try to get answers to your questions. I am pretty sure we are using the latest values as part of our latest inventory estimates; I am less familiar with current practices I rule making but will find out

Hope you are well

Chris

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
(202) 343-9140 (Office)
Ex. 6 Personal Privacy (PP)

On Apr 11, 2021, at 9:13 PM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:

Paul-

Ex. 5 Deliberative Process (DP)

What am I missing here?

Chris

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
(202) 343-9140 (Office)
Ex. 6 Personal Privacy (PP)

Begin forwarded message:

From: "Wyborny, Lester" <wyborny.lester@epa.gov>
Date: April 11, 2021 at 7:32:07 PM EDT
To: "Grundler, Christopher" <grundler.christopher@epa.gov>
Subject: Why wouldn't EPA move to the AR5 GWP values for methane?

Weighing my options, Chris, I decided to reach out directly to you on this matter because of my relationship with you while working in OTAQ.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Lester

<Climate Change-Methane's Global Warming Potential -Scientist letter to key Administration policy-makers-July 29 2014.pdf>

Message

From: Gunning, Paul [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F65040017F05429AA05572F096A50463-PGUNNING]
Sent: 4/7/2021 3:13:52 PM
To: Irving, Bill [Irving.Bill@epa.gov]; Kocchi, Suzanne [Kocchi.Suzanne@epa.gov]; Sarofim, Marcus [Sarofim.Marcus@epa.gov]; Desai, Mausami [Desai.Mausami@epa.gov]
CC: Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]; Fawcett, Allen [Fawcett.Allen@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]
Subject: RE: Methane question

Excellent!! Thanks everyone for the quick turn.

Paul

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Sent: Wednesday, April 7, 2021 11:10 AM
To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
Subject: RE: Methane question

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Sent: Tuesday, April 06, 2021 7:05 PM
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Ex. 5 Deliberative Process (DP)

EPA's webpage on GWPs (https://www.epa.gov/ghgemissions/understanding-global-warming-potentials) does present the AR5 GWPs in order to "reflect the state of the science", and includes a FAQ regarding the use of AR4 numbers due to UNFCCC reporting guidelines.

-Marcus

From: Desai, Mausami <Desai.Mausami@epa.gov>
Sent: Tuesday, April 06, 2021 6:54 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>
Cc: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>
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Subject: RE: Methane question

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Cc: Gunning, Paul <Gunning.Paul@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Fawcett, Allen <Fawcett.Allen@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Birnbaum, Rona <Birnbaum.Rona@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Subject: Re: Methane question

+Mausami who may have already responded to this person.

Sent from my iPhone

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Please see below. Can we draft up something short and sweet on this? Thanks.

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To: Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
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Subject: RE: Methane question

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Just wondering how formal of a write up do you need?

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To: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Subject: Methane question

Hi Chris, Suzie and Paul,

Following the Agency's Scientific Integrity Annual Meeting last week, Francesca Grifo received a query from an EPA employee about whether the global warming potential for methane would be updated. I told her I do some sleuthing and report back. Can you all provide any responses to the questions below? Appreciate any light you could shed.

Thanks,

Betsy

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Message

From: Shaw, Betsy [Shaw.Betsy@epa.gov]
Sent: 10/14/2021 10:37:52 PM
To: Sarofim, Marcus [Sarofim.Marcus@epa.gov]; Gunning, Paul [Gunning.Paul@epa.gov]
CC: Grundler, Christopher [grundler.christopher@epa.gov]; Kocchi, Suzanne [Kocchi.Suzanne@epa.gov]; Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]
Subject: RE: SI Question Follow Up

I like it. Thanks Marcus!

From: Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Sent: Thursday, October 14, 2021 6:05 PM
To: Shaw, Betsy <Shaw.Betsy@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: RE: SI Question Follow Up

Ex. 5 Deliberative Process (DP)

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Thursday, October 14, 2021 5:39 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: RE: SI Question Follow Up

Ex. 5 Deliberative Process (DP)

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Thursday, October 14, 2021 4:59 PM

To: Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Shaw, Betsy <Shaw.Betsy@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: RE: SI Question Follow Up

Good catch, thx Marcus!

From: Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Sent: Thursday, October 14, 2021 4:56 PM
To: Shaw, Betsy <Shaw.Betsy@epa.gov>; Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: RE: SI Question Follow Up

Good catch! A new version is attached. And as long as we have the opportunity, I wanted to update Paul's original email

Ex. 5 Deliberative Process (DP)

-Marcus

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Thursday, October 14, 2021 4:51 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz,

Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: SI Question Follow Up

Hi again Paul.

Ex. 5 Deliberative Process (DP)

Thanks,

Betsy

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Thursday, October 14, 2021 4:29 PM
To: Shaw, Betsy <Shaw.Betsy@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: SI Question Follow Up

Yes, sounds good Betsy.

Paul

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Thursday, October 14, 2021 3:38 PM
To: Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: SI Question Follow Up

Thanks so much Paul and Marcus! I will share the information you provided with the person making the inquiry and, with your okay, provide your names as being available to discuss or answer any additional questions. Let me know if you're cool with that.

Thanks,

Betsy

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Thursday, October 14, 2021 3:33 PM
To: Shaw, Betsy <Shaw.Betsy@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: SI Question Follow Up

Betsy,

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Again, there is more background in the attached memo. Hopefully this is responsive to the requestor.

Best Regards,

Paul

Paul M Gunning
Director, Climate Change Division
U.S. Environmental Protection Agency
Office – 202-343-9736
Ex. 6 Personal Privacy (PP)

From: Shaw, Betsy <Shaw.Betsy@epa.gov>
Sent: Wednesday, October 13, 2021 9:36 AM
To: Gunning, Paul <Gunning.Paul@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: RE: SI Question Follow Up

Hi Paul,

Just checking in on how you are coming with a written response to this inquiry. Let me know when you get a chance.

Thanks,

Betsy

From: Gunning, Paul <Gunning.Paul@epa.gov>
Sent: Wednesday, September 22, 2021 7:20 PM

To: Shaw, Betsy <Shaw.Betsy@epa.gov>
Cc: Grundler, Christopher <grundler.christopher@epa.gov>; Kocchi, Suzanne <Kocchi.Suzanne@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Subject: Re: SI Question Follow Up

Thanks Betsy. I would recommend we pull together a written response to avoid any confusion. It could also serve as the basis for a more productive follow up call if necessary. Hope that works

Paul

Sent from my iPhone

On Sep 22, 2021, at 3:25 PM, Shaw, Betsy <Shaw.Betsy@epa.gov> wrote:

Hi Chris, Suzie and Paul,

Ex. 5 Deliberative Process (DP)

Thanks,

Betsy

Follow up question from requestor:

I assert that the response does not fully respond to the issues I am raising. I can understand why EPA has continued to use AR4 methane GWP values for reporting EPA GHG emissions to the UN, consistent with reporting by all other of the world's counties.

However, there is no reason to continue to use outdated methane GWP values for our regulations. In addition to the AR4 methane GWP values being outdated by 7 years, if this year's regulations continue to be based on the outdated AR4 GWP values, the legacy of these outdated methane GWP values will continue for years, and maybe even decades, into the future. EPA should decouple GHG analysis and resulting policy established in our regulations from reporting to the UN, which are much lower in importance. Using the UN reporting agreements to establish the rest of our GHG policy is inappropriate.

The IPCC reports are the preeminent source of GHG analysis available. The IPCC reports are repeated every 6 years, which indicates the gravity of climate change. The AR5 report made the following statement:

"Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks. {2}"

This seems to be a vary dramatic statement, but EPA's continued reliance on outdated methane GWP values suggests that EPA is not taking climate change seriously enough. But the Biden Administration has stated that it will take climate change very seriously, and it has named two climate czars, Gina McCarthy for domestic climate issues, and John Kerry for global issues. If this Administration is really taking climate change seriously as suggested by these appointments, moving to the AR5 methane GWP values would be consistent with that commitment.

The reference to the Phase 2 HD truck GHG standards response to comments (which is copied in below) also supports moving to the AR5 methane GWP values. The CO2-methane trading allowed under the regulations use the AR5 GWP value of 34 for methane (see the text highlighted in red). This value takes effect in 2021. Well, this is 2021, so moving to AR5 methane GWP values would be consistent with the policy established in that past regulation. The text which references using the AR4 values for reporting as the reason for solely relying on the AR4 methane GWP values is also highlighted in blue, however, as stated above, that should not figure into the GWP values used for establishing our regulations.

Phase 2 HD Truck GHG Standards Response to Comments:
Response The Phase 1 GHG rule included a compliance alternative allowing heavy-duty manufacturers and conversion companies to comply with the respective methane or nitrous oxide standards by means of over-complying with CO2 standards (40 CFR 85.525). More specially, EPA allows manufacturers to use CO2 credits (generated from the same averaging set) to comply with the methane and nitrous oxide requirements after adjusting the CO2 emission credits based on the relative GHG equivalents. To establish the GHG equivalents used by the CO2 credits program, the Phase 1 heavy-duty vehicle rulemaking incorporated the IPCC Fourth Assessment Report GWP values of 25 for CH4 and 298 for N2O, which are assessed over a 100 year lifetime. EPA is largely continuing this allowance for Phase 2.

Since the Phase 1 rule was finalized, a new IPCC report has been released with new GWP estimates. EPA asked for comment on whether the methane GWP used to establish the GHG equivalency value for the CO2 Credit program should be updated to those established by IPCC in its Fifth Assessment Report (AR5). The IPCC AR5 presents four different potential values for the GWP of methane over a 100 year lifetime, ranging from 28 to 36. These values are the result of slightly different calculation methods. Therefore, we not only requested comment on whether to update the GWP for methane to that of the AR5, but also on which value to use from this report. The GWPs of 28 and 30 are both a result of using a carbon cycle approach consistent with that used in the Fourth Assessment Report. This carbon cycle approach included a climate-carbon feedback when calculating the lifetime of a pulse of carbon dioxide emissions, but did not include any climate-carbon feedback when calculating the impacts of a pulse of non-CO2 greenhouse gas emissions. As the GWP is the ratio of the impact of a pulse of non-CO2 GHG emissions relative to a pulse of carbon dioxide emissions, a second approach was presented where the non-CO2 GHG pulse also included climate-carbon feedbacks. This second approach yields GWP values of 34 or 36. For the purposes of this rule, EPA is choosing the approach that includes climate-carbon feedbacks for both non-CO2 and CO2 pulses, as the agency considers this the approach most likely to be adopted by the international scientific community in future assessments on the timescale of this rule. The IPCC presents the value of 34 as the default value for the methane GWP, but also reports a value of 36 for

"fossil" methane to take into account the atmospheric CO2 that would result from the oxidation of methane in the atmosphere.

We received a number of comments on this issue. For the most part, the environmental community favored using the more recent GWP value and even some commented that EPA should use a methane GWP based on a 20 year timeframe. On the other hand, the natural gas industry and natural gas truck manufacturers commented that EPA should not update to the newer GWP values but continue to use the methane GWP value from the AR4 IPCC report because EPA is still using the methane GWP from the AR4 today in other contexts. Ex. 5 Deliberative Process (DP) Ex. 5 Deliberative Process (DP) Thus, commenters opposing the use the methane GWP from the later IPCC report are not persuasive. EPA will continue to base the credit adjustment on a 100 year timescale because it seems to best balance short-term versus long-term effects of climate change.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP) The choice of this GWP value for future rules on this timescale does not prejudice the choice of other GWP values for use in regulations and other purposes in the near term.

Ex. 5 Deliberative Process (DP)

The agencies understand that methane's GWP varies based on the time periods over which the heat trapping impact of methane is evaluated. Ex. 5 Deliberative Process (DP) Ex. 5 Deliberative Process (DP) Ex. 5 Deliberative Process (DP) To show the effect that different GWPs based on different timeframes have on the lifecycle impact, the agencies also provided lifecycle comparisons between natural gas heavy-duty trucks and diesel fuel heavy-duty trucks when methane and nitrous oxide are evaluated over 20 year and 500 year timeframes. See RIA 13.1.4.

EPA's sole use of 100 year methane GWP values (see the text above in green) as the "best compromise between short term and long term effects" is inconsistent with the IPCC and the view of climate scientists. First, while the AR4 report provided 20, 100 and 500 year values, the AR5 report only reported 100 and 20 year values. The 100 year value is no longer "in the middle of the range," so to speak. Therefore, EPA should not continue to make the case for solely using 100 year values. Furthermore, a letter sent to EPA way back in 2014 by many of the preeminent nation's climate scientists, including the lead author for IPCC's AR5 technical assessment for the radiative forcing of GHGs, urged EPA to move straight away to the AR5 values, but also to consider the 20 year methane GWP values along with the 100 year values. This letter is attached. If the nation's preeminent climate scientists are arguing for using the 20 year methane GWP values, why is EPA stating something different? It seems that EPA is relying on outdated values.

In fact, having reviewed IPCC AR5 technical analysis of methane's GWP, and the letter from climate scientists to EPA way back in 2015 when I analyzed and wrote up the HD truck GHG assessment for methane use for the Phase 2 rule, I asked OAP for permission to model GHG impacts of methane use by HD trucks using both 20 and 100 year AR5 methane GWP values. OAP agreed, and that is part of the record.

Thus considering both 20 and 100 year values for methane's GWP would be consistent with the IPCC's report, the views of climate scientists, and some analysis already conducted by EPA.

Thus, EPA must move to AR5 methane GWP values for its regulations, and consider both 20 and 100 year values.

Message

From: Sarofim, Marcus [Sarofim.Marcus@epa.gov]
Sent: 2/10/2022 2:26:13 AM
To: Schmeltz, Rachel [Schmeltz.Rachel@epa.gov]; Irving, Bill [Irving.Bill@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Desai, Mausami [Desai.Mausami@epa.gov]
CC: Martinich, Jeremy [Martinich.Jeremy@epa.gov]
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Oh, and finally, inside climate news has the EPA responses to this issue:
https://insideclimatenews.org/news/09022022/methane-global-warming-study/

From: Sarofim, Marcus
Sent: Wednesday, February 9, 2022 8:52 PM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Cc: Martinich, Jeremy <Martinich.Jeremy@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Well, they do acknowledge what I see as the key flaw:

"One potential criticism of our framework (and other work upon which it builds [20, 24, 25, 48]) is that it is valid only until the time of peak temperature. Furthermore, it implicitly ignores temperature impacts that occur after the peak. This criticism is valid, but we argue that it is best aimed toward the creation and modification of climate goals, rather than at the specifics of our framework. No single emission metric can be used in all applications; we simply present the time horizons that align with the climate goals already set in the Paris Agreement."

From: Sarofim, Marcus
Sent: Wednesday, February 9, 2022 8:46 PM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Irving, Bill <Irving.Bill@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Ex. 5 Deliberative Process (DP)

https://www.eurekalert.org/news-releases/942370
https://iopscience.iop.org/article/10.1088/1748-9326/ac4940

Anyway, we'll probably get even more press on this…

From: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Sent: Monday, February 7, 2022 3:30 PM
To: Irving, Bill <Irving.Bill@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Thanks all for the quick replies!

From: Irving, Bill <Irving.Bill@epa.gov>
Sent: Monday, February 07, 2022 3:19 PM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Looks good – nothing to add.

From: Weitz, Melissa <Weitz.Melissa@epa.gov>
Sent: Monday, February 07, 2022 3:05 PM
To: Desai, Mausami <Desai.Mausami@epa.gov>; Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>
Cc: Irving, Bill <Irving.Bill@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

Some ideas in red to make things clearer (though I also think they are already clear).

From: Desai, Mausami <Desai.Mausami@epa.gov>
Sent: Monday, February 7, 2022 3:01 PM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>; Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Irving, Bill <Irving.Bill@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent - follow up

I think we did, but maybe they are not reading the responses:

Why does the EPA use a Global Warming Potential for methane based on IPCC AR4 when UNFCCC international reporting guidelines set in 2018 state that countries should use IPCC AR5?

See response to question 2i. The reporting guidelines decided upon by Parties under the UNFCCC in 2018, i.e. the Katowice Rulebook, ~~do not~~ go into effect ~~until~~ in 2024 when the first reports under Paris are due. See *https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-paris-agreement*. Until 2024, UNFCCC requires use of AR4 GWPs for national reporting.

When will EPA update its reporting to AR5?

See response to question 2i. As required by UNFCCC, EPA will update its reporting in the national GHG inventory published in April 2024.

From: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Sent: Monday, February 7, 2022 2:40 PM
To: Sarofim, Marcus <Sarofim.Marcus@epa.gov>; Desai, Mausami <Desai.Mausami@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Irving, Bill <Irving.Bill@epa.gov>
Subject: FW: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent

More on this press inquiry. You've already answered the second follow on question below. But not sure about the first one re change in reporting guideline set in 2018?
Hopefully this is another quick reply. They are asking for a reply to this latest question by noon tomorrow (Tuesday).
Thanks
Rachel

From: Stevens, Katherine <stevens.katherine@epa.gov>
Sent: Monday, February 07, 2022 1:09 PM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Cc: DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent

Also...
He also sent over a few others with a deadline of noon tomorrow. Let me know if you need me to ask for extra time on these.

"Could you also please respond to the follow, two related questions on methane reporting;

-Why does the EPA use a Global Warming Potential for methane based on IPCC AR4 when UNFCCC international reporting guidelines set in 2018 state that countries should use IPCC AR5?
-When will EPA update its reporting to AR5?

Background:
EPA states on its website;
"The EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (Inventory) complies with international GHG reporting standards under the United Nations Framework Convention on Climate Change (UNFCCC). UNFCCC guidelines now require the use of the GWP values for the IPCC's Fourth Assessment Report (AR4), published in 2007."
https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why

However;
The UNFCCC "Common metrics," 2020 states that in Dec. 2018 countries agreed to use the Fifth Assessment Report;

"The APA concluded its deliberations at CMA 1 (December 2018), and Parties agreed that Parties account for anthropogenic emissions and removals in accordance with common metrics assessed by the IPCC and in accordance with decision 18/CMA.1 (decision 4/CMA.1, annex II, paragraph 1(a)). Pursuant the modalities, procedures and guidelines (MPGs) for the transparency framework for action and support adopted by decision 18/CMP.1, Parties agreed to use the 100-year time-horizon GWP values from the Fifth Assessment Report of the IPCC (see table 8.A.1), or 100-year time-horizon GWP values from a subsequent IPCC assessment report as agreed upon by the CMA, to report aggregate emissions and removals of GHGs, expressed in CO2 eq (decision 18/CMA.1, annex, paragraph 37)." https://unfccc.int/process-and-meetings/transparency-and-reporting/methods-for-climate-change-transparency/common-metrics

My deadline for these follow up questions is noon ET tomorrow Tuesday Feb 8."

From: Stevens, Katherine
Sent: Friday, February 4, 2022 10:46 AM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Cc: DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent

Thanks!

From: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Sent: Friday, February 4, 2022 10:46 AM
To: Stevens, Katherine <stevens.katherine@epa.gov>
Cc: DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent

Got this Kati. Don't think any of these questions are new to us.
Will check in with Marcus and Melissa on providing written responses by Monday's deadline.
Thanks
Rachel

From: Stevens, Katherine <stevens.katherine@epa.gov>
Sent: Friday, February 04, 2022 10:43 AM
To: Schmeltz, Rachel <Schmeltz.Rachel@epa.gov>
Cc: DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: FW: DDL: 2/7: Request for Comment: EPA's GWP value for methane: Urgent

All CCD? DDL: 2/7.

From: Philip McKenna <phil.mckenna@insideclimatenews.org>
Date: February 4, 2022 at 10:38:03 AM EST
To: "Jones, Enesta" <Jones.Enesta@epa.gov>
Cc: EPA Press Office <press@epa.gov>
Subject: Re: Request for Comment: EPA's GWP value for methane: Urgent

Great, thanks Enesta.
Best,
Phil

On Fri, Feb 4, 2022 at 10:29 AM Jones, Enesta <Jones.Enesta@epa.gov> wrote:

> Hi Phil — I am checking and have noted your deadline.
>
> On Feb 4, 2022, at 10:27 AM, Philip McKenna <phil.mckenna@insideclimatenews.org> wrote:
>
> Hi Enesta,
> I'm writing an article on the attached study coming out next Wednesday by researchers at Stanford University on the different Global Warming Potential values used for methane and the policy implications of these different values.
>
> The researchers state that "the EPA's value for methane mitigation is out of step—at least three times too low—with realizing the administration's target [of limiting warming to 1.5 C]".
>
> For my article, could you please respond to the following questions;
>
> 1.Does the EPA's Global Warming Potential value for methane of 25 align with the Biden administration's efforts to limit warming to 1.5 C?
>
> 2. Why does the EPA use the 100-year Global Warming Potential value rather than the 20-year Global Warming Potential value as a measure of the relative climate impact of methane?

3. Why does the EPA use the IPCC's Fourth Assessment Report (AR4), published in 2007, rather than the IPCC's Sixth Assessment Report (AR6), published in 2021 for its Global Warming Potential values?

4. Do UNFCCC guidelines require the use of 100 year Global Warming Potential values?

5. Has or will the EPA encourage the UNFCCC to revise its guidelines to use IPCC's Sixth Assessment Report (AR6), published in 2021 rather than the IPCC's Fourth Assessment Report (AR4), published in 2007 for its Global Warming Potential values?

6. Would the EPA consider adding an additional line and calculations for methane to its Greenhouse Gas Equivalency Calculator that use a 20-year GWP value based on IPCC's Sixth Assessment Report (AR6) in addition to the current line and calculations that use a 100-year GWP based on IPCC's 4th Assessment Report (AR4)?
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

My deadline for comment is 6pm ET on Monday February 7.

Best,
Phil

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Phil McKenna | Reporter
617.553.4941 O. | 617.642.0305 C.
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Pronouns: he/him

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